Chapter 10 - East and West Branches of the California Aqueduct

Potential Contaminant Source or Watershed Activity	Report Section	Water Quality Parameters									
		TDS/ Salts	Organic Carbon	Bromide	Pesticides	Nutrients	Pathogens	Trace Elements	Turbidity	T&O	Hydro- carbons
WEST BRANCH											
Animal Populations	10.1.3.1					○	○		○		
Recreation	10.1.3.2						○		○		
Urban Runoff	10.1.3.3				○						
EAST BRANCH											
Recreation	10.2.3.1						⊙	○	○	○	
Traffic Accidents/Spills	10.2.3.2										⊙
Unauthorized Activity	10.2.3.3										
Urban Runoff	10.2.3.4	⊙	⊙		⊙	⊙	⊙		⊙		
Algal Blooms	10.2.3.5								⊙	●	
Groundwater Discharges	10.2.3.6										
Other Potential Sources	10.2.3.7										⊙

Rating symbols:

● PCS is a highly significant threat to drinking water quality

◒ PCS is a medium threat to drinking water quality

⊙ PCS is a potential threat, but available information is inadequate to rate the threat

○ PCS is a minor threat to drinking water quality

Blank cells indicate PCS not a source of contaminant

Contents

Tables

Figures

10

East and West Branches of the California Aqueduct

Just after the Tehachapi Afterbay, the California Aqueduct bifurcates into the East and West Branches. The bifurcation occurs after Check 41 at about mile 303.92 (DWR 1999). This chapter of *Sanitary Survey Update 2001* covers the canal, tunnel, and pipeline sections of the West and East Branches. Chapter 7, Southern California Reservoirs, describes reservoirs in these 2 branch aqueducts.

10.1 WEST BRANCH

10.1.1 WATER SUPPLY SYSTEM

10.1.1.1 Description of Aqueduct and SWP Facilities

The West Branch (Figure 10-1) starts at mile 0 immediately after the bifurcation and flows through the Oso siphon to the Oso Pumping Plant at mile 1.49. The plant lifts the water 231 feet into Quail Canal, which flows through Check 1 at mile 4.64 into Quail Lake. Quail Lake discharges into Lower Quail Canal at mile 6.07, which enters the Peace Valley Pipeline at mile 8.25. The 5.8-mile pipeline drops the water into the William E. Warne Powerplant at mile 14.07. The water is discharged into Pyramid Lake, then travels through the 7.2-mile Angeles Tunnel into the Castaic Powerplant. From the power plant, the water is discharged into Elderberry Forebay, which acts as an afterbay to the power plant, providing a pool of water that can be pumped back into Pyramid Lake during off-peak hours. The forebay also serves to maintain a relatively constant surface elevation in Castaic Lake. The Los Angeles Department of Water and Power constructed Elderberry Forebay and is responsible for its operation. Water is discharged from Elderberry Forebay into Castaic Lake, which is the southern terminus of West Branch.

Of its total length of approximately 25 miles, West Branch has 8.4 miles of open canal. There are 3 pools in the branch. A pool is the reach between check structures. The open canal is located in the upper reach, which is sparsely populated. The rest is pipeline and tunnel (Table 10-1).

Table 10-1 Sectional Lengths (miles) of the West Branch

Type	Length in Miles
Canals	8.4[a]
Tunnel	7.2
Pipeline	5.5
Reservoirs	10.8
Total	31.9

Source: DWR 1999
[a] Including Quail Lake.

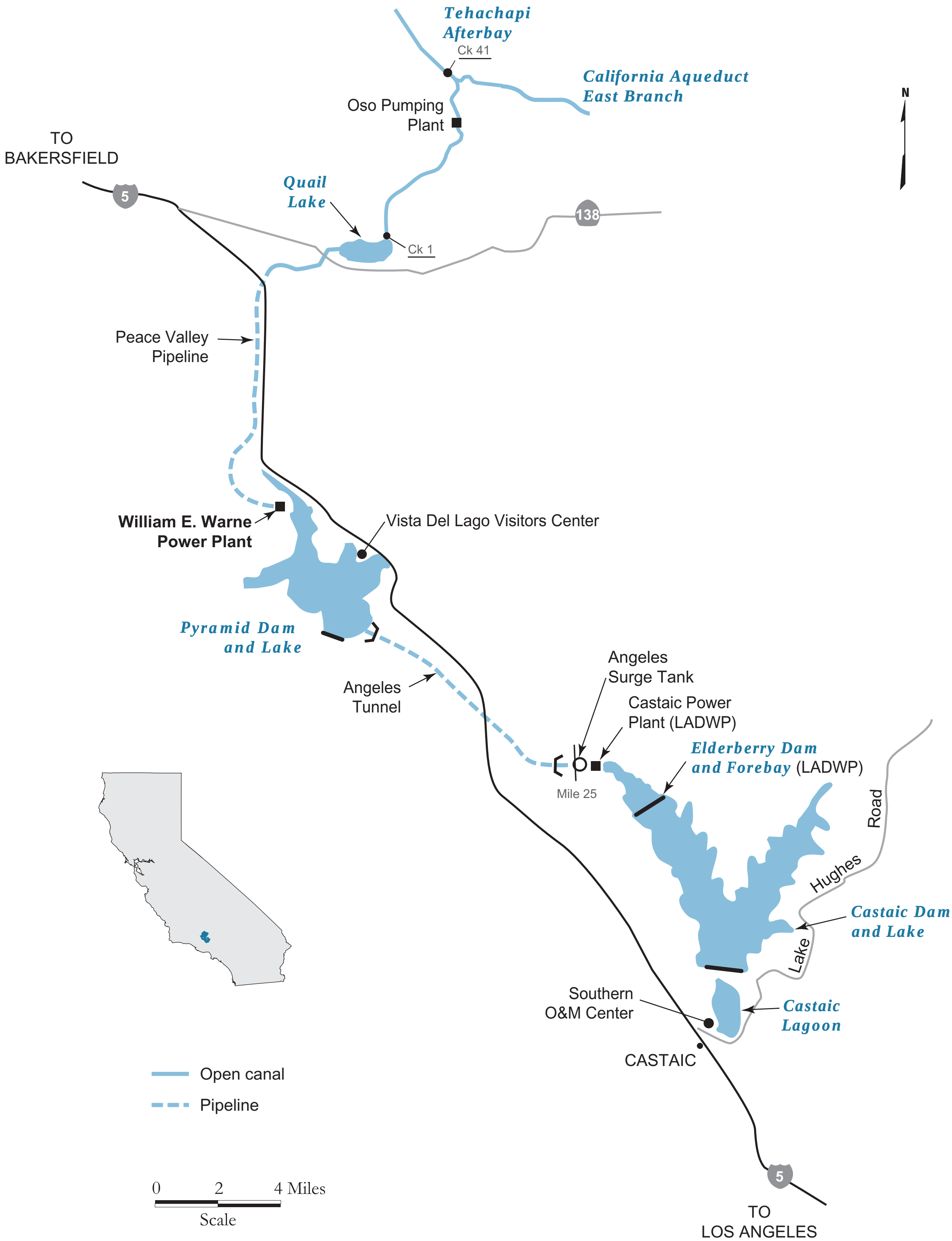
10.1.1.2 Description of Agencies Using SWP Water

The West Branch terminates into Castaic Lake. For a listing of agencies using Pyramid Lake water, see Chapter 7, Section 7.1.2.2. For a listing of agencies using Castaic Lake water and their entitlements, see Chapter 7, Section 7.2.2.2.

10.1.2 WATERSHED DESCRIPTION

The section of the West Branch below Quail Lake is within Angeles National Forest. Most of this aqueduct section consists of pipeline or tunnel. Angeles National Forest topography ranges from 280 feet to 8,000 feet above sea level (USDA 1998). The area is in earthquake zones, including those of San Andreas and Big Pine faults (USDA 1998). Rainfall ranges from 6 to 40 inches. Pines and firs cover the higher elevations while chaparral covers the lower elevations. Land use activities include many types of recreation, telecommunication sites, utility corridors, filmmaking, and mining (USDA 1998).

Figure 10-1 California Aqueduct: West Branch



The 8.4-mile open section of the aqueduct includes Quail Lake and is in western Antelope Valley. Quail Lake is a sag pond on the San Andreas Fault that was enlarged to its current 7,580 acre-feet during construction of the State Water Project (SWP) (DWR 1999). The lake provides water storage for Warne Powerplant and has a watershed of about 4 square miles and vertical relief from 3,300 to 4,400 feet. Wildlife is found in the watershed, and livestock graze around the lake. Fishing amenities are accessible from Highway 138.

10.1.3 Potential Contaminant Sources

There are no industrial or wastewater treatment plants along or near the West Branch Aqueduct. There are relatively few infrastructure sources of contamination (Table 10-2).

Table 10-2 Potential Sources of Contamination on the West Branch

Description	Type	Number
Bridges	State	1
	County	0
	Private	1
Turnouts		2
Culverts		10
Overchutes		0
Pipelines	Gas	6
	Oil	4
	Water	0

There are only 2 bridges over West Branch Aqueduct. The 4 oil pipelines may pose a potential hazard. The major potential contaminant sources involve activities in the Quail Lake watershed.

10.1.3.1 Animal Populations

There are cattle-grazing operations and wild animal populations within the 4 square-mile Quail Lake watershed. Watershed runoff is conveyed to the lake via natural drainage and piped conduits. The amount of drainage is unknown.

10.1.3.2 Recreation

About 10,000 people fish Quail Lake annually, but swimming and boating are not allowed. Fishing sites are accessible from a parking lot off Highway 138. There are picnic tables and restrooms at the parking lot (DWR 1997).

10.1.3.3 Urban Runoff

According to *Sanitary Survey 1990*, there is a glider airport and 3 residences with septic systems near the lake. No new information was available.

10.1.4 Water Quality Summary

No water quality data are collected along the open canal sections of the West Branch. No accidents or illegal dumping incidences were reported by the Joint Operations Center (JOC).

10.1.5 Significance of Potential Contaminant Sources

Quail Lake and the adjoining open canal sections are the only areas exposed to potential contaminant sources along the West Branch Aqueduct. Quail Lake is a flow-through system and is flushed rapidly. The Quail Lake watershed is only 4 square miles and probably does not contribute significant contaminants to West Branch. Livestock graze in the watershed, but the extent is unknown.

10.1.6 Watershed Management Practices

No management activities are likely to impact water quality in the West Branch Aqueduct.

10.2 EAST BRANCH

10.2.1 WATER SUPPLY SYSTEM

10.2.1.1 Description of Aqueduct and SWP Facilities

The 148.5-mile East Branch traverses Antelope Valley and the San Bernardino Mountains and terminates at Perris Lake near the city of Riverside (Figure 10-2). The East Branch Aqueduct has about 93 miles of open canals and 32 miles of enclosed pipeline and tunnels (Table 10-3). The canals have 24 pools and a capacity of 2,630 to 2,880 cfs (DWR 1999). There are no river or stream inflows from surrounding watershed.

Table 10-3 Sectional Lengths (miles) of the East Branch

	East Branch	East Branch Extension
Canals	93.4	
Tunnel	3.8	
Pipeline	28.1	13
Reservoirs	23.2	
Total	148.5	13

Source: DWR 1999

After the bifurcation, the East Branch flow passes through the Alamo Powerplant for power generation. It then travels 55 miles in open canal to Pearblossom Pumping Plant at mile 360.59, where water is lifted 540 feet (DWR 1999).

Water then flows downhill in open canal to Check 66 at mile 403.41 where it enters underground pipelines for about 2.2 miles to the Mojave Siphon Powerplant before entering Silverwood Lake. From the lake, water is discharged into the 3.8-mile San Bernardino Tunnel at mile 407.65. The tunnel discharges into the Devil Canyon Powerplant (mile 411.34). From the power plant's afterbays at mile 412.88, water is distributed through the 28-mile buried Santa Ana Pipeline to Lake Perris at mile 440.97.

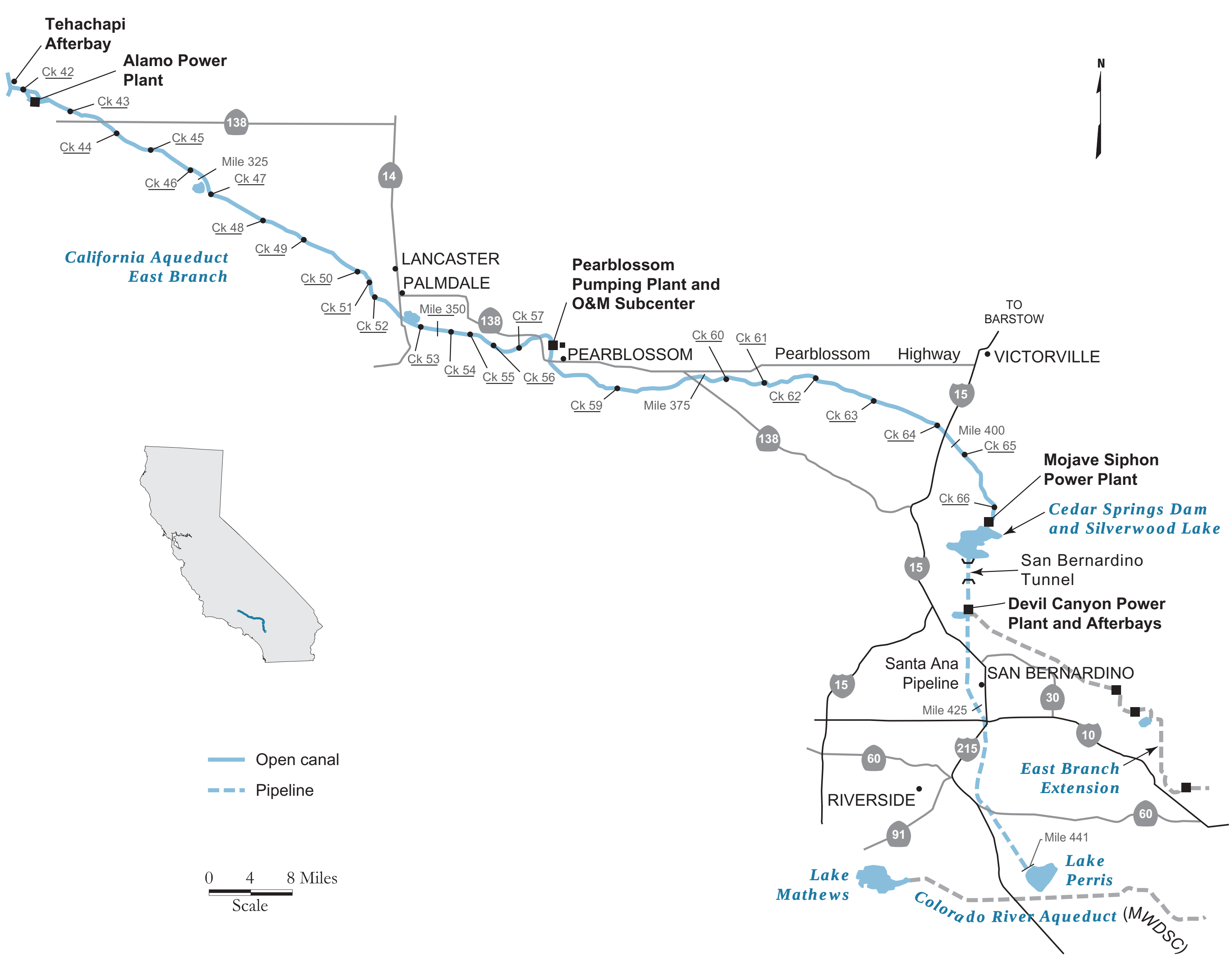


Figure 10-2 California Aqueduct: East Branch

East Branch Extension: Phase 1 and Phase 2

The East Bay Extension (EBX) has been in planning since 1962 when the San Gorgonio Pass Water Agency (SGPWA) contracted with the SWP for water to supplement groundwater supplies in the service area. The area has experienced groundwater overdrafts since the 1980s. Currently, the overdraft is 25% more than the basin's safe yield (DWR 2001). DWR is the lead construction agency for the extension in cooperation with the SGPWA and the San Bernardino Valley Municipal Water District (SBVMWD). When the EBX completed, DWR will turn over its operation to the SGPWA and the SBVMWD. The 2 agencies also will manage retirement of the construction debt.

Phase 1 will include construction of a 13-mile pipeline and use of the SBVMWD's 19-mile Foothill Pipeline. The EBX will serve the communities of Yucaipa, Calimesa, Banning, and Beaumont in San Bernardino and Riverside counties (DWR 2001). The inlet to Foothill Pipeline is at Devil Canyon Powerplant's afterbays. The EBX will terminate at Noble Creek near Beaumont in Riverside County. Phase 1 was expected to be completed in June 2001 and will supply up to 8,650 acre-feet annually at a flow of about 16 cfs. The EBX will have 3 pumping plants and a 5-acre reservoir at Crafton Hills. With an additional capacity of 8,650 acre-feet annually, EBX Phase 2 is proposed for the future when demand increases beyond the 16 cfs of Phase 1. Phase 2 will be a new pipeline that will bypass the SBVMWD's Foothill Pipeline.

10.2.1.2 Description of Agencies Using SWP Water

SWP contractors and entitlements for the East Branch are summarized in Chapter 7. Briefly, Metropolitan Water District of Southern California (MWDSC) and Antelope Valley-East Kern Water Agency (AVEK) are the largest contractors served by this section of the aqueduct. The Littlerock Creek Irrigation District (LCID) does not divert water directly from the aqueduct but is reliant on Palmdale Water District's turnout, which diverts the combined agencies' allotments into Lake Palmdale where it is mixed with discharge from Littlerock Reservoir. LCID then draws its allotment from the Palmdale reservoir. Mojave Water District's turnout is near Hesperia, with water passing through the Morongo Basin Pipeline; the district uses the water for groundwater recharge.

10.2.2 Watershed Description

After the bifurcation, the East Branch crosses the San Gabriel and San Bernardino Mountains at the edge of Antelope Valley. The aqueduct passes through Silverwood Lake and on to Lake Perris. The San Andreas Fault runs along the southern slope of Antelope Valley. Despite the fault's proximity, the aqueduct's current location was the preferred alternative that minimized earthquake risk (DWR 1974).

Antelope Valley is in the western part of the Mojave Desert, which is mainly alluvial. The valley is a closed basin, and rainfall percolates into the ground or collects in the lower sections.

10.2.3 Potential Contaminant Sources

Organic carbon and bromide are mainly imported from the Delta. Nutrients and turbidity may originate from the Delta as well as in the watersheds of the reservoirs discussed in chapters 6 and 7. Contaminants imported from outside the East Branch can only be managed at the source and will not be discussed here.

There are about 93 miles of open canal sections traversing large populated areas. There are no stream drainages from the watershed into this section of the aqueduct. Table 10-4 lists other potential sources of contamination. These sources add to the imported contaminant load, but there are no data to estimate their relative contributions.

Table 10-4 Potential Sources of Contamination in the East Branch

Description	Type	Number
Bridges	State	8
	County	40
	Private	18
Turnouts		17
Culverts		106
Overchutes		85
Pipelines	Gas	5
	Oil	1
	Water	40

10.2.3.1 Recreation

Recreation activities such as fishing and picnicking occur at some of the open canal sections, especially bridge overcrossings. These were described in *Sanitary Survey 1990*. No additional information was available.

10.2.3.2 Traffic Accidents/Spills

Many roads cross the East Branch over its 66 bridges, which belong to the State or counties or are privately owned, such as farming roads. Potential for contamination of the aqueduct exists in the event of an automobile or commercial truck accident. However, there were no reported accidents or spills during this reporting period. Caltrans is in the process of enlarging the Highway 14 bridge near Palmdale.

The JOC records daily incidents that occur along the aqueduct. The East Branch had more reported incidents involving vehicles and other objects than any other section of the aqueduct (Table 10-5). However, these incidents are not separated into those originating from vehicle accidents and those originating from illegal dumping of stolen vehicles. The JOC reports incidents as they occur, but in general, police have little information on the incidents unless the vehicle had been reported stolen. Therefore, follow-up information on removal and remediation is not often available.

Table 10-5 Reported Incidents in the East Branch

Date	Vehicle	Motor Cycle	Body	Other	Location	Comments
11 Sep 1996				Truck observed dumping heavy objects into aqueduct	Pool 58	Vehicle impounded
12 Sep 1996	1				Pool 58	
4 Nov 1996	2				Pool 50	
9 Nov 1996				Spill of 220 gallons of hydraulic oil	Pearblossom	
17 Dec 1996	1				Pool 65	
17 Dec 1996	5				Pool 66	
19 Dec 1996	1				Pool 65	
22 Dec 1996	1				Pool 65	
7 Aug 1997				Pipe bomb	Downstream of Check 66	Later found to be fake
22 Mar 1998			1		Pool 53	
22 Mar 1998	1		1		Pool 63	
4 Jul 1998	1		3		Pool 60	
8 Jul 1998	1		1		Pool 53	
23 Oct 1998			1		Pool 64	
2 Feb 1999		1	1		Pool 53	
8 Jul 1999	1		1		Pool 53	
4 Aug 1999	1				Pool 66	
25 Aug 1999	1				Pool 66	
2 Sep 1999	1				Pool 63	
Total	18	1	9			

Other potential sources of spills are aqueduct facilities. The pumps and generators use hydraulic oil, which may leak following accidents or malfunctions. For example, on 9 November 1996, 220 gallons of hydraulic oil leaked at the Pearblossom Pumping Plant, according to JOC reports. The oil was contained with booms.

10.2.3.3 Unauthorized Activity

The East Branch traverses populated areas, and there is potential for illegal dumping from roadsides and the 66 bridges. Between 1996 and 1999, 19 motor vehicles and 9 bodies were found in the East Branch Aqueduct. Most incidents occurred between Pool 53 and Pool 66 (Table 10-5). Many of the vehicles had been reported stolen. Others had entered the aqueduct under unknown circumstances. The vehicles were usually detected during low flows. A complete inspection of this section of the aqueduct's bottom has not been performed, and likely there are more vehicles and other debris in the pools. Vehicles can leak chemicals such as MTBE, oils, coolants and refrigerants, which may affect water quality; the extent and impacts of such leaks are unknown.

10.2.3.4 Urban Runoff

There are 45 drop inlets along a 1.8-mile stretch of the East Branch within Hesperia, an unincorporated community under the jurisdiction of San Bernardino County. The inlets are between 30 and 36 inches in diameter and convey storm water into the aqueduct at about mile 397 (Figure 10-3). The drains likely contribute total dissolved solids (TDS), metals, nutrients, and organics to the East Branch. The inlets were installed during construction of the aqueduct to prevent flood damage to downstream urban properties. Population growth and expansion in Hesperia continue to increase storm water discharge. Quarterly monitoring by DWR Operations and Maintenance Division (O&M) at Check 66 indicates that these storm water inflows have had no significant impact on water quality. However, storms are relatively unpredictable in this area, so no studies have been conducted to evaluate the water quality of aqueduct or floodwater inflow during these events.

To lessen the impact of urban storm water inflows on East Branch water quality, DWR has been coordinating with San Bernardino County and other contractors to study modifications that would minimize or eliminate storm water inflows. In response, the San Bernardino County Flood Control District has proposed a Hesperia Master Plan of Drainage (MPD). The MPD would utilize a canal to intercept storm water and direct flow away from the aqueduct into detention ponds, where the runoff would seep into the ground or evaporate. To implement the MPD, San Bernardino County has requested DWR to pay the $17 million cost of the project (Hunt pers. comm. 2001). As of February 2001, DWR was studying the proposal. It was not known when a decision would be made.

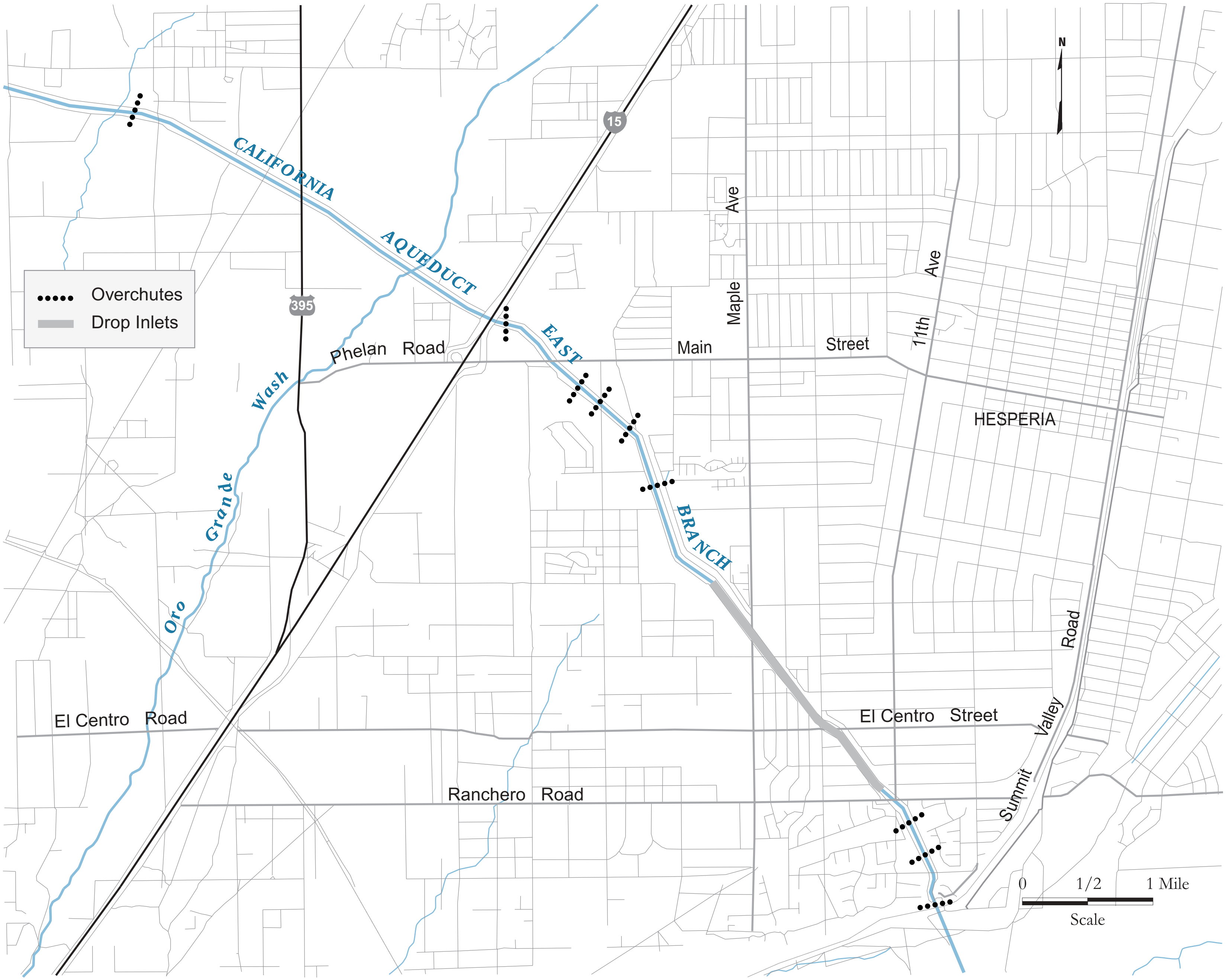
10.2.3.5 Algal Blooms

Abundant nutrients, long days and warm water temperatures create ideal growing conditions for attached algae in the East Branch Aqueduct during the summer. An Algal Growth Potential (AGP) experiment conducted by MWDSC indicated a dry weight biomass production of 40 to 45 mg/L with SWP sample water. For comparison, a similar experiment, using Colorado River water, produced an AGP of 1.5 to 2 mg/L dry weight (MWDSC unpublished AGP experiment, 28 Feb 1996). Algal blooms can lead to increased turbidity, filter clogging, and taste and odor problems at water treatment facilities. Taste and odor have been the most serious problem from algal blooms. Taste and odor problems are primarily caused when some, but not all, genera of algae produce 2 algal exudates: geosmin and 2-methylisoborneol (MIB). DWR and MWDSC conducted investigations to determine the algae involved in the taste and odor episode of 1990-1991 (Faulconer pers. comm 2001). A *Microcoleus*-like organism was isolated but was not positively identified. Subsequent investigations between 1992 and 1994 found additional taste and odor-producing algae namely *Lyngbya* and *Hyella* (Izaguirre and Taylor 1995).

The last serious algal blooms were reported in the dry years of 1990-1991. Since that time there have been no reported blooms, most likely because of increased use of copper compounds to control algal growth. Palmdale Water District, which has a turnout on East Branch at Reach 20B, mile 343.74, continuously treats the SWP water with Cutrine Plus® at its turnout into Lake Palmdale (Dluzak pers. comm 1999). The district also treats the lake biweekly with copper sulfate.

Many methods are used to monitor taste and odor problems (McGuire and others 1981). The oldest method is sensory analysis of water samples using the human nose. The resulting threshold odor number (TON) can indicate when a problem may be developing. A second method is microbiological culturing and identification in the laboratory, but culturing could take 7 to 14 days. Closed-loop stripping analysis (CLSA) is a more advanced and rapid method based on removing semi-volatile organic compounds such as geosmin and MIB from water using a recirculating stream of air.

Figure 10-3 Hesperia Stormwater Drain Inlets, East Branch California Aqueduct



The air sample is later analyzed with gas chromatography-mass spectrometry to quantify the concentrations of geosmin and MIB. MWDSC has been using CLSA since 1979. DWR visually inspects the aqueduct and also uses results of CLSA conducted by MWDSC to monitor algal growth in East Branch. Although this method can be used as a general algal growth indicator, it may not pinpoint the exact source of the nuisance algae in flowing water.

10.2.3.6 Groundwater Discharges

Where the groundwater level is high, it is possible for seepage into the aqueduct to occur at joints. This is probably an insignificant contaminant source. In other sections, sump pumps are used to pump the groundwater into the aqueduct to avoid impacting the canal (DWR 1974). There is a concentration of sump pumps near Leona siphon at mile 342.

10.2.3.7 Other Potential Sources

According to questionnaire responses received from water contractors, there were no indications that the contamination from agricultural activities, overchutes or turnouts had changed significantly since *Sanitary Survey 1996*. There are 46 pipelines, but only 1 oil pipeline, which can be considered a hazard (Table 10-4).

10.2.4 Water Quality Summary

The only water quality data available were from the beginning and end of the East Branch (Checks 41 and 66). Water quality at Check 41 and in reservoirs fed by the East and West Branches is discussed in Chapter 7. Reference to MCLs is made for comparison purposes only with the understanding that the aqueduct represents raw water and all MCL values were met in treated water.

10.2.4.1 Minerals

Only quarterly monitoring water quality data were available along the East Branch. Mineral concentrations at Check 66 were low compared to MCLs (where established). Comparison of water quality data at Check 41 and 66 (Table 10-6 and Table 10-7) does not indicate significant changes in concentration for most analytes between these stations. Turbidity was an exception with no detections in 5 of the 16 samples at Check 66. It is likely that these data are erroneous.

10.2.4.2 Minor Elements

Arsenic was reported above the detection limit once, but it was below the MCL (Table 10-6 and Table 10-7). Chromium, iron, and manganese were detected in 20% or fewer of the samples.

10.2.4.3 Nutrients

Nutrient concentrations in the East Branch were low in comparison to drinking water MCLs (Table 10-6 and Table 10-7). There was a slight decrease in nitrates and nitrate/nitrite from Check 41 to Check 66 indicating algal assimilation in reservoirs or open canal sections of the East Branch. Observed nutrient levels were probably enough to stimulate algal growth if other conditions such as low flows and temperature had occurred (Faulconer pers. comm 2001). Based on these results and findings in Chapter 9, Coastal Branch, it appears that algal uptake removes an appreciable portion of the nitrogen load transported from the Delta.

10.2.4.4 Organic Carbon and Bromide

Total organic carbon (TOC) at Check 66 ranged between 3.4 and 5.1 mg/L, higher than the CALFED target of 3 mg/L at Banks Pumping Plant (Table 10-7). The highest TOC concentrations occurred in February and March, which could be due to storm water flows (see Section 10.2.3.4). The maximum TOC concentration of 5.1 mg/L at Check 66 was significantly lower than the maximum concentration of 9.3 mg/L at Check 41. This may suggest that Lake Silverwood acts as a TOC sink. More frequent sampling will be required to understand TOC source and sinks in the SWP.

The overall mean bromide concentration in the East Branch at Check 66 was 0.04 mg/L, and measurable levels were detected in only 4 out of 15 samples. As with TOC, mean bromide levels at Check 41, 0.15 mg/L, were higher than at Check 66 and may suggest that Lake Silverwood also acts as a sink for bromide.

10.2.5 Significance of Potential Contaminant Sources

Watershed runoff in streams or rivers does not enter into the East Branch Aqueduct and is, therefore, not a potential contaminant source. Roadside runoff occurs in some sections, but contaminant loading is likely to be insignificant. In contrast, storm water runoff from the community of Hesperia has been a concern and has a greater potential to affect water quality in the East Branch. More intensive sampling data are needed to assess this potential. Urban runoff may contribute TDS, TOC, nutrients, and hydrocarbons to the aqueduct and is deserving of further study.

Most nutrients are imported from the Delta, although there are probably contributions from reservoir watersheds, recreational use, and possibly atmospheric deposition of nitrogen.

Table 10-6 Water Quality Data at Check 41, Jan 1996 to Dec 1999

Parameter (mg/L)	Mean	Median	Low	High	Percentile 10-90%	Detection Limit	# of Detects Samples
Minerals							
Calcium	18	18	10	28.1	14-22.8	1	47/47
Chloride	48	48	2	107	20.6-78.4	1	47/47
Total Dissolved Solids	208.4	217.5	73	345	138-284.5	1	46/46
Hardness	86	90	33	131	61.2-114	1	47/47
Conductivity (µS/cm)	371	392	106	607	237-521.5	1	46/46
Magnesium	9.8	10	2	15.3	6.2-13	1	47/47
Sulfate	32	31	4	60	19-53.8	1	47/47
Turbidity (NTU)	24.8	21	2	140	4.6-47.4	1	47/47
Minor Elements							
Arsenic	0.0022	0.002	<0.001	0.004	0.002-0.003	0.001	48/49
Boron	0.15	0.1	<0.1	0.3	0.1-0.2	0.1	41/47
Chromium	0.0051	0.005	<0.005	0.007	0.005-0.005	0.005	8/49
Copper	0.0032	0.002	<0.001	0.005	0.002-0.005	0.001	31/49
Iron	0.0085	0.005	<0.005	0.05	0.005-0.0196	0.005	15/48
Selenium	0.001	0.001	<0.001	0.001	0.001-0.001	0.001	4/47
Zinc	0.0108	0.005	<0.005	0.05	0.005-0.0297	0.005	9/48
Nutrients							
Total Nitrogen (Org+NH_4)	0.5	0.4	0.2	1.2	0.3-0.74	0.1	27/27
Nitrate (as NO_3)	2.9	2.55	0.3	8	1.35-4.9	0.1	46/46
Nitrate + Nitrite (as N)	0.7	0.6	0.09	1.9	0.27-1.04	0.01	48/48
OrthoPhosphate	0.08	0.07	<0.01	0.23	0.036-0.104	0.01	45/47
Total Phosphorus	0.13	0.13	0.04	0.31	0.07-0.194	0.01	47/47
Misc.							
Bromide	0.15	0.14	<0.01	0.38	0.060-0.254	0.01	46/47
Total Organic Carbon	3.6	3.2	2.2	9.3	2.5-4.8	0.1	48/48
pH (pH unit)	7.6	7.6	7	8.7	7.2-8	0.1	23/23
UVA (Abs @ 254 nm)	0.0836	0.071	0.06	0.149	0.064-0.131	0.001	23/23

Source: DWR O&M database May 2000
Notes: pH data from Jan 1998 to Dec 1999 only.
Total Nitrogen data from Jan 1996 to Mar 1998 only.

Table 10-7 Water Quality Data at Check 66, Jan 1996 to Dec 1999

Parameter (mg/L)	Mean	Median	Low	High	Percentile 10-90%	Detection Limit	# of Detects/ Samples
Minerals							
Calcium	18	19	13	23	15-21	1	15/15
Chloride	50	52	3	99	24-79	1	16/16
Total Dissolved Solids	210	213	83	299	146-280	1	16/16
Hardness (as $CACO_3$)	87	92	42	107	67-106	1	17/17
Conductivity (µS/cm)	371	394	130	570	256-487	1	16/16
Total Alkalinity	73	73	52	97	65-84	1	16/16
Magnesium	10	11	3	13	7-13	1	16/16
Sulfate	29	28	1	46	21-42	1	16/16
Turbidity (NTU)	17	6	<1	68	1-40	1	11/16
Minor Elements							
Arsenic	0.002	0.002	0.002	0.003	0.002-0.003	0.002	11/11
Chromium			<0.005	0.005		0.005	2/11
Copper	0.003	0.003	<0.002	0.005	0.002-0.004	0.001	10/11
Iron			<0.005	0.014		0.005	1/11
Manganese			<0.005	0.026		0.005	2/11
Nutrients							
Total Nitrogen (Org+NH_4)	0.5	0.5	0.3	0.9	0.3-0.7	0.1	26/26
Nitrate (as NO_3)	1.8	1.5	0.3	4.2	0.8-3.5	0.1	16/16
Nitrate + Nitrite (as N)	0.49	0.46	0.07	1.00	0.18-0.89	0.01	47/47
OrthoPhosphate	0.07	0.07	<0.01	0.14	0.03-0.10	0.01	45/47
Total Phosphorus	0.11	0.10	<0.01	0.22	0.06-0.17	0.01	46/47
Misc.							
Bromide	0.04	0.01	<0.01	0.17	0.01-0.13	0.01	4/15
Total Organic Carbon	3.4	3.6	<0.1	5.1	2.7-4.6	0.1	15/16
pH (pH unit)	7.9	8.0	7.0	8.9	7.4-8.5	0.1	16/16
UVA (abs/cm @ 254 nm)	0.021	0.001	<0.001	0.071	0.001-0.070	0.001	5/17

Source: DWR O&M Division database May 2000
Note: Total Nitrogen data from Jan 1996 to Mar 1998 only.

Recreation such as fishing and picnicking occurs at bridges and open sections of the East Branch. However, there are no data to quantify the relative contributions of these different sources. High nutrient levels combined with high light levels and warm temperatures can result in nuisance algal blooms, which can lead to significant taste and odor problems. O&M monitors algal growth and initiates preventive measures, such as copper additions, as needed.

Illegal dumping, especially from bridges, is a potential contaminant source of unknown extent. There have been reports of people dumping from bridges, but most turned out to be false alarms. In 1 instance, a citizen's report of dumping from a bridge turned out to be somebody emptying an ice chest after failing to catch any fish (Faulconer pers. comm 2001). The JOC has documented incidents involving the dumping of stolen vehicles. Fluids from the vehicles can be a source of contamination. No analytical data on petroleum hydrocarbons were available, and relative contaminant contributions from these sources are unknown.

10.2.6 Watershed Management Practices

A number of agencies besides DWR have operations that may impact the East Branch. Both private and public roads and 66 bridges crisscross the East Branch. Various agencies manage and maintain these facilities. Through Caltrans, the State manages its bridges and roadside drainage. Caltrans has a statewide Storm Water Management Program to mitigate effects of storm water runoff from highways and streets. The East Branch is in Los Angeles and San Bernardino counties, and maintenance activities on county roads and bridges could potentially affect water quality in the East Branch.

San Bernardino County is involved in managing the urban runoff in Hesperia. Managing the urban runoff will involve the Lahontan Regional Water Quality Control Board, which oversees this region's Basin Plan.

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